

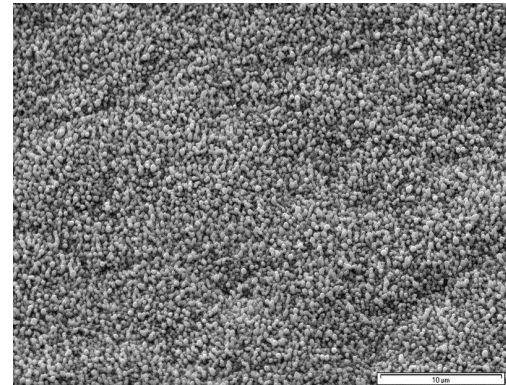


# BF-ANP

## Technical Characteristics

**BF-ANP** style foil is a so-called “profile free” electro-deposited copper foil, characterized by high ductility at room temperature and lower electrical resistivity compared to regular ED foils. The ultra-flat profile ensures a minimalist skin depth penetration thus reducing conductor losses for high speed digital applications and reducing the passive intermodulation (PIM) in RF applications.

Typical substrates include very low loss and ultra-low loss resin systems (Df < 0.005 @10 GHz), PTFE resin types and blends mainly for 5G applications.



Treatment side  
35 µm BF-ANP

### Typical average properties\*

BF-ANP									
MEASURED PARAMETERS		UNITS	PRODUCT GAUGE				IPC		
Nominal Thickness		µm oz.	9 1/4	12 3/8	18 1/2	35 1	Specification IPC-4562A	Test Method IPC-TM-650	
Area Weight		oz/ft <sup>2</sup> g/m <sup>2</sup> g/254 in <sup>2</sup>	0.24 74 12.1	0.34 103 16.9	0.48 145 23.8	0.91 278 45.6	(a)1.2.5, table 1-1 (b)3.4.4 (c)4.6.3	2.2.12	
Untreated Side Line Roughness	Ra	ISO 4287	≤ 0.25 (≤ 9.8)				3.5.6	2.2.17	
Untreated Side Surface Roughness	Sa	ISO 25178	~ 0.20 (~ 7.9)				-	2.2.22 Draft <sup>[2]</sup>	
	Sq		~ 0.25 (~ 9.8)				-		
Treated Side Line Roughness	Rz	ISO 4287	≤ 2.0 (≤ 79)	≤ 1.6 (≤ 63)	≤ 1.4 (≤ 55)	≤ 1.3 (≤ 52)	3.4.5	2.2.17	
	Rz	JIS B 601	≤ 1.6 (≤ 63)	≤ 1.2 (≤ 47)	≤ 1.1 (≤ 43)	≤ 1.0 (≤ 39)	-	-	
Treated Side Surface Roughness	Sa	ISO 25178	~ 0.27 (~ 10.6)	~ 0.23 (~ 9.1)	~ 0.20 (~ 7.9)	~ 0.18 (~ 7.1)	-	2.2.22 Draft <sup>[2]</sup>	
	Sq		~ 0.35 (~ 13.8)	~ 0.29 (~ 11.4)	~ 0.26 (~ 10.2)	~ 0.22 (~ 8.7)	-		
	Sz		~ 3.5 (~ 138)	~ 3.0 (~ 118)	~ 2.7 (~ 106)	~ 2.5 (~ 98)	-		
Tensile Strength Transverse at RT		MPa (k.Lb/in <sup>2</sup> )	≥ 207 (≥ 30)				≥ 276 (≥ 40)	3.5.1	2.4.18
Tensile Strength Transverse at 180 °C			≥ 103 (≥ 15)				≥ 138 (≥ 20)		
Elongation Transverse at RT		%	4 - 10	5 - 20	7 - 25	10 - 30	3.5.3		
Elongation Transverse at 180 °C			5 - 25	9 - 25	10 - 35	10 - 40			
Peel Strength (RT) <sup>[1]</sup> on Ultra Low Loss Resin		N/mm (Lb/in)	≥ 0.6 <sup>[3]</sup> (≥ 3.4)	≥ 0.35 (≥ 2.0)	≥ 0.45 (≥ 2.6)	≥ 0.6 (≥ 3.4)	3.5.4	2.4.8	
High Temp. Tarnish Resistance		-	60 min @ 180 °C in air: pass				-	-	
Solderability		-	Complies with IPC specification				3.6.3	2.4.12	

<sup>[1]</sup> Laminate construction with thickness ≥ 0.5 mm  
<sup>[3]</sup> after built-up to 35 µm

<sup>[2]</sup> Final draft of TM 2.2.22 as of Sept. 29th, 2015

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